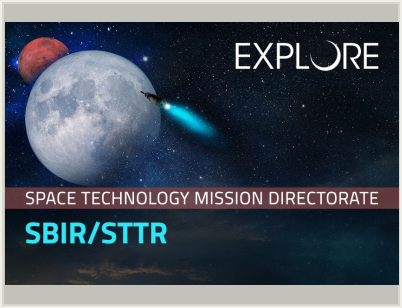
Wind Shift Detection Model, Phase I

Completed Technology Project (2015 - 2015)

Project Introduction

On a daily basis, airport managers manually analyze current and future weather conditions to determine whether their facility will be negatively impacted. While not the only weather factor, one of the more important factors is wind, specifically wind shifts. Every morning the runway configuration for an airport is set based on the expected dominant wind flow across the area in order to maximize the efficiency of the terminal area. If the wind does not change direction over the course of the day, the airport is able operate at its optimum level, barring any other impactful weather event. If the wind does shift its direction, a change in the airport's runway configuration is required. This decision of when to change the runway configuration, however, is not always easy, and often times it can be a difficult and sometimes costly one. If the configuration of the runway is changed too late or too early in relation to the time of the wind shift, the throughput at the airport will decrease. To support this decision, a wind shift detection model is proposed. This model will utilize operational weather products, including the Localized Aviation MOS Product (LAMP) and the High Resolution Rapid Refresh (HRRR), to produce a probabilistic estimate of when a wind shift is expected to occur. By automating the process of detecting wind shifts, it improves the efficiency of the airport by allowing airport managers to focus on configuring the airport rather than when the wind shift will occur. To determine the accuracy and feasibility of the model for use in real-time operations, it will be tested at number of airports around the NAS, specifically for historical scenarios when an unexpected wind shift negatively impacted operations. Phase II will look at adding a live weather data feed to the, incorporating traffic data, as well as integrating the model within the Airport Runway Configuration Management (ARCM) concept.



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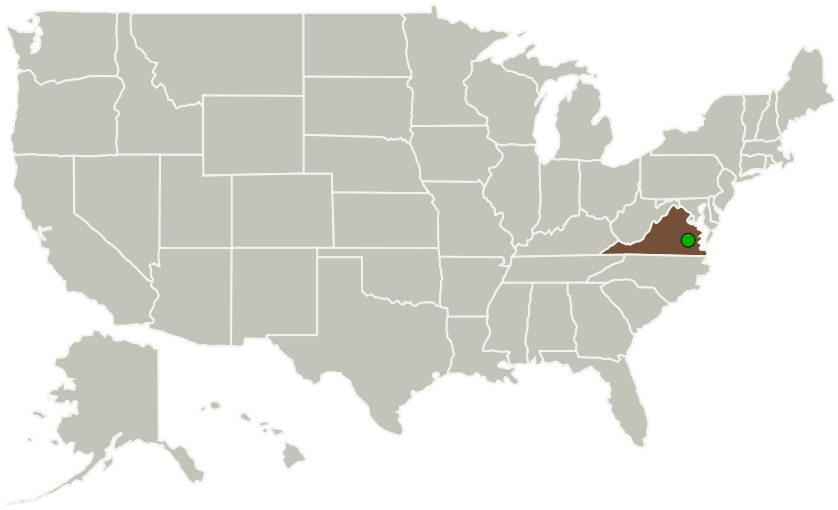
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Mosaic ATM, Inc.	Lead Organization	Industry	Leesburg, Virginia
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations
Virginia

Project Transitions

June 2015: Project Start

December 2015: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139557)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Mosaic ATM, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

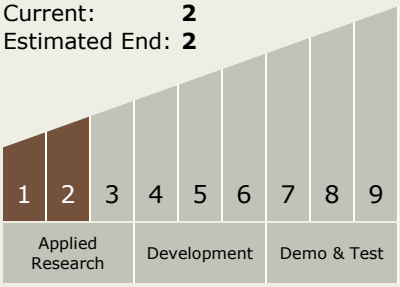
Carlos Torrez

Principal Investigator:

Jonathan Cunningham

Technology Maturity (TRL)

Start: **1**
Current: **2**
Estimated End: **2**



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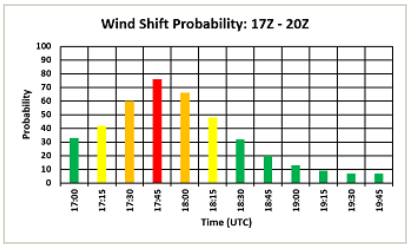
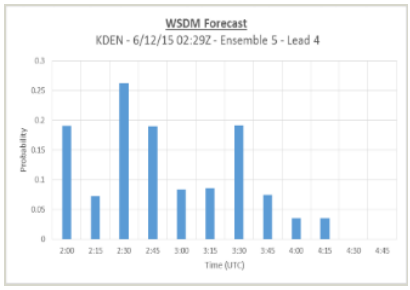
Images



Briefing Chart
Wind Shift Detection Model Briefing Chart
(https://techport.nasa.gov/image/125781)



Final Summary Chart Image
Wind Shift Detection Model, Phase I Project Image
(https://techport.nasa.gov/image/133721)

Technology Areas

Primary:

- TX16 Air Traffic Management and Range Tracking Systems
  - TX16.2 Weather/Environment

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System